

### **Amendments to the Claims**

This listing of claims will replace the originally filed claims in the application.

#### **Listing of Claims:**

Claims 1 – 19 (cancelled).

Claims 20 – 43 (cancelled).

Claim 44 (new): A method which may be used for converting gaseous hydrocarbons to liquid hydrocarbons in which a Fischer-Tropsch process is employed, said method comprising:

- a) producing liquid hydrocarbons and a waste gas, wherein said waste gas comprises:
  - 1) hydrogen;
  - 2) carbon dioxide; and
  - 3) hydrocarbons with no more than 6 carbon atoms; and
- b) separating said waste gas into at least three product streams, wherein said separation comprises the production of:
  - 1) at least one gas stream comprising methane, wherein the recovery rate of hydrogen and carbon monoxide is at least about 60%;
  - 2) at least one gas stream with a carbon dioxide recovery rate of at least about 40%; and
  - 3) at least one supplementary gas stream, wherein said supplementary gas stream comprises hydrocarbons with at least 2 carbon atoms.

Claim 45 (new): The method of claim 44, wherein said separation of said waste gas further comprises separation with a PSA separation unit having at least one adsorber.

Claim 46 (new): The method of claim 45, further comprising producing at least one gas stream comprising hydrogen with said PSA separation unit.

Claim 47 (new): The method of claim 45, wherein said separating said waste gas further comprises producing at least one gas stream comprising hydrogen with a second PSA separation unit.

**Claim 48 (new):** The method of claim 45, wherein:

- a) said waste gas further comprises nitrogen; and
- b) said separation of said waste gas further comprises producing at least one gas stream comprising nitrogen.

**Claim 49 (new):** The method of claim 45, wherein each adsorber of said PSA separation unit comprises:

- a) a first bed comprising alumina;
- b) a second bed comprising silica gel; and
- c) a third bed comprising at least one adsorbent, wherein:
  - 1) said adsorbent comprises at least one member selected from the group consisting of:
    - i) zeolite;
    - ii) carbon molecular sieves; and
    - iii) titanium silicate; and
  - 2) said adsorbent has an average pore size between about 3.4 Å and about 5 Å.

**Claim 50 (new):** The method of claim 49, wherein said average pore size is between about 3.7 Å and about 4.4 Å.

**Claim 51 (new):** The method of claim 49, wherein said waste gas flows through said first bed, then through said second bed, and finally through said third bed.

**Claim 52 (new):** The method of claim 49, wherein each said adsorber of said PSA separation unit further comprises a fourth adsorbent bed which is located, in said waste gas flow direction, after said third bed.

**Claim 53 (new):** The method of claim 52, wherein:

- a) said adsorbent of said third bed comprises carbon molecular sieves; and
- b) said fourth bed comprises zeolite or an activated charcoal.

**Claim 54 (new):** The method of claim 53, further comprising producing at least one gas stream comprising hydrogen with said PSA separation unit.

**Claim 55 (new):** The method of claim 47, wherein an adsorber of said second PSA separation unit comprises an adsorbent bed comprising at least one activated charcoal.

**Claim 56 (new):** The method of claim 49, wherein each adsorber of said PSA separation unit comprises a fourth or a fifth bed that comprises at least one member selected from the group consisting of:

- a) titanium-silicate; and
- b) zeolite.

**Claim 57 (new):** The method of claim 56, wherein:

- a) said waste gas comprises nitrogen; and
- b) said separation of said waste gas further comprises producing at least one gas stream comprising nitrogen.

**Claim 58 (new):** The method of claim 44, further comprising:

- a) treating said at least one gas stream comprising methane with a cryogenic unit, wherein said treating occurs downstream of said waste gas separation;
- b) producing at least one stream consisting essentially of hydrogen and carbon monoxide; and
- c) producing at least one stream comprising methane.

**Claim 59 (new):** The method of claim 44, further comprising:

- a) treating said gas stream comprising methane with a cryogenic unit, wherein said treating occurs downstream of said waste gas separation;
- b) producing at least one stream consisting essentially of hydrogen;
- c) producing at least one stream comprising carbon monoxide; and
- d) producing at least one stream consisting essentially of methane.

**Claim 60 (new):** The method of claim 44, further comprising:

- a) treating said gas stream comprising methane first with a PSA adsorber, wherein said treating occurs downstream of said waste gas separation;
- b) producing at least one stream consisting essentially of hydrogen; and
- c) producing at least one stream comprising carbon monoxide and methane.

**Claim 61 (new):** The method of claim 44, further comprising synthesizing a gas comprising hydrogen and carbon monoxide from a reagent gas, wherein said reagent gas comprises at least a portion of said gas stream comprising methane.

**Claim 62 (new):** The method of claim 44, wherein at least a portion of said gas stream comprising methane is used as a reagent gas in said Fischer-Tropsch process.

**Claim 63 (new):** The method of claim 44, further comprising using at least a portion of said supplementary gas stream as fuel.

**Claim 64 (new):** The method of claim 44, further comprising using at least a portion of said supplementary gas as a reagent gas for the generation of synthesis gas.

**Claim 65 (new):** The method of claim 46, further comprising using at least a portion of said gas stream comprising hydrogen for hydrocracking.

**Claim 66 (new):** The method of claim 47, further comprising using at least a portion of said gas stream comprising hydrogen for hydrocracking.

**Claim 67 (new):** The method of claim 59, further comprising using at least a portion of said gas stream comprising hydrogen for hydrocracking.

**Claim 68 (new):** The method of claim 60, further comprising using at least a portion of said gas stream comprising hydrogen for hydrocracking.

**Claim 69 (new):** The method of claim 44, wherein at least a portion of said stream with a carbon dioxide recovery rate of at least about 40%, is used as a reagent gas for producing a synthesis gas which comprises hydrogen and carbon monoxide.

**Claim 70 (new):** A method which may be used for converting gaseous hydrocarbons to liquid hydrocarbons in which a Fischer-Tropsch process is employed, wherein:

- a) said method comprises:
  - 1) producing liquid hydrocarbons and a waste gas, wherein said waste gas comprises:
    - i) hydrogen;
    - ii) carbon dioxide;
    - iii) hydrocarbons with no more than 6 carbon atoms; and
    - iv) nitrogen; and
  - 2) separating said waste gas into at least three product streams, wherein said separation comprises the production of:

- i) at least one gas stream comprising methane, wherein the recovery rate of hydrogen and carbon monoxide is at least about 60%;
  - ii) at least one gas stream with a carbon dioxide recovery rate of at least about 40%;
  - iii) at least one supplementary gas stream, wherein said supplementary gas stream comprises hydrocarbons with at least 2 carbon atoms; and
  - iv) at least one gas stream comprising nitrogen;
- b) said separating said waste gas further comprises separation with a PSA separation unit having at least one adsorber;
- c) each said adsorber of said PSA separation unit comprises:
  - 1) a first bed comprising alumina;
  - 2) a second bed comprising silica gel;
  - 3) a third bed comprising at least one adsorbent, wherein:
    - i) said adsorbent comprises at least one member selected from the group consisting of:
      - aa) zeolite;
      - bb) carbon molecular sieves; and
      - cc) titanium silicate; and
    - ii) said adsorbent has an average pore sized between about 3.4 Å and about 5 Å; and
  - 4) a fourth bed comprising at least one member selected from the group consisting of:
    - i) titanium-silicate; and
    - ii) zeolite; and
- d) at least one gas stream comprising hydrogen is produced by said PSA separation unit.

Claim 71 (new): A method which may be used for converting gaseous hydrocarbons to liquid hydrocarbons in which a Fischer-Tropsch process is employed, said method comprising:

- a) producing liquid hydrocarbons and a waste gas, wherein said waste gas comprises:
  - 1) hydrogen;
  - 2) carbon dioxide; and
  - 3) hydrocarbons with no more than 6 carbon atoms;

- b) separating said waste gas into at least three product streams, with a PSA separation unit, wherein said separation comprises the production of:
  - 1) at least one gas stream comprising methane, wherein the recovery rate of hydrogen and carbon monoxide is at least about 60%;
  - 2) at least one gas stream with a carbon dioxide recovery rate of at least about 40%; and
  - 3) at least one supplementary gas stream, wherein said supplementary gas stream comprises hydrocarbons with at least 2 carbon atoms;
- c) treating said gas stream comprising methane with a cryogenic unit, wherein said treating comprises:
  - 1) producing at least one stream consisting essentially of hydrogen;
  - 2) producing at least one stream comprising carbon monoxide; and
  - 3) producing at least one stream consisting essentially of methane; and
- d) hydrocracking at least a portion of said stream consisting essentially of hydrogen.